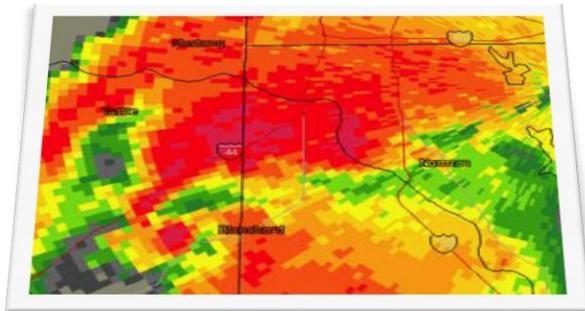


2012 National Severe Weather Workshop

March 1 -3, 2012

NOAA National Weather Service Storm Prediction Center
Norman, Oklahoma

Recent EF-5 Tornado Disaster Recovery Efforts: Lessons Learned from Greensburg & Parkersburg



Jack L. Rozdilsky, Ph.D.
Western Illinois University



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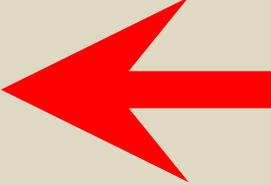
Recent EF-5 Tornado Disaster Recovery Efforts

AGENDA

1. Introduction
2. Research Project Overview
3. Greensburg, Kansas
4. Parkersburg, Iowa
5. Analysis
6. Conclusion

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Introduction

Brief Introduction to Presenter

- Jack Rozdilsky, Ph.D.
 - Assistant Professor, Emergency Management
- Western Illinois University
Macomb, Illinois
- Research Area
 - Long-term recovery from natural disasters

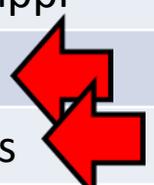


F-5 & EF-5 Tornadoes

Greensburg & Parkersburg Last EF-5s Prior to 2011

Date	Location
May 24, 2011	El Reno / Piedmont, Oklahoma
May 22, 2011	Joplin, Missouri
April 27, 2011	Rainsville / Sylvania, Alabama
April 27, 2011	Preston, Mississippi
April 27, 2011	Hackleburg / Phil Campbell, Alabama
April 27, 2011	Smithville, Mississippi
May 25, 2008	Parkersburg, Iowa
May 4, 2007	Greensburg Kansas
May 3, 1999	Bridge Creek / Moore, Oklahoma
April 16, 1998	Waynesboro, Tennessee

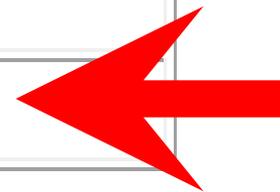
2011



Enhanced Fujita Scale for Tornadoes

Operational Scale for 3-Second Wind Gusts

OPERATIONAL EF SCALE	
EF Number	3 Second Gust (mph)
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200



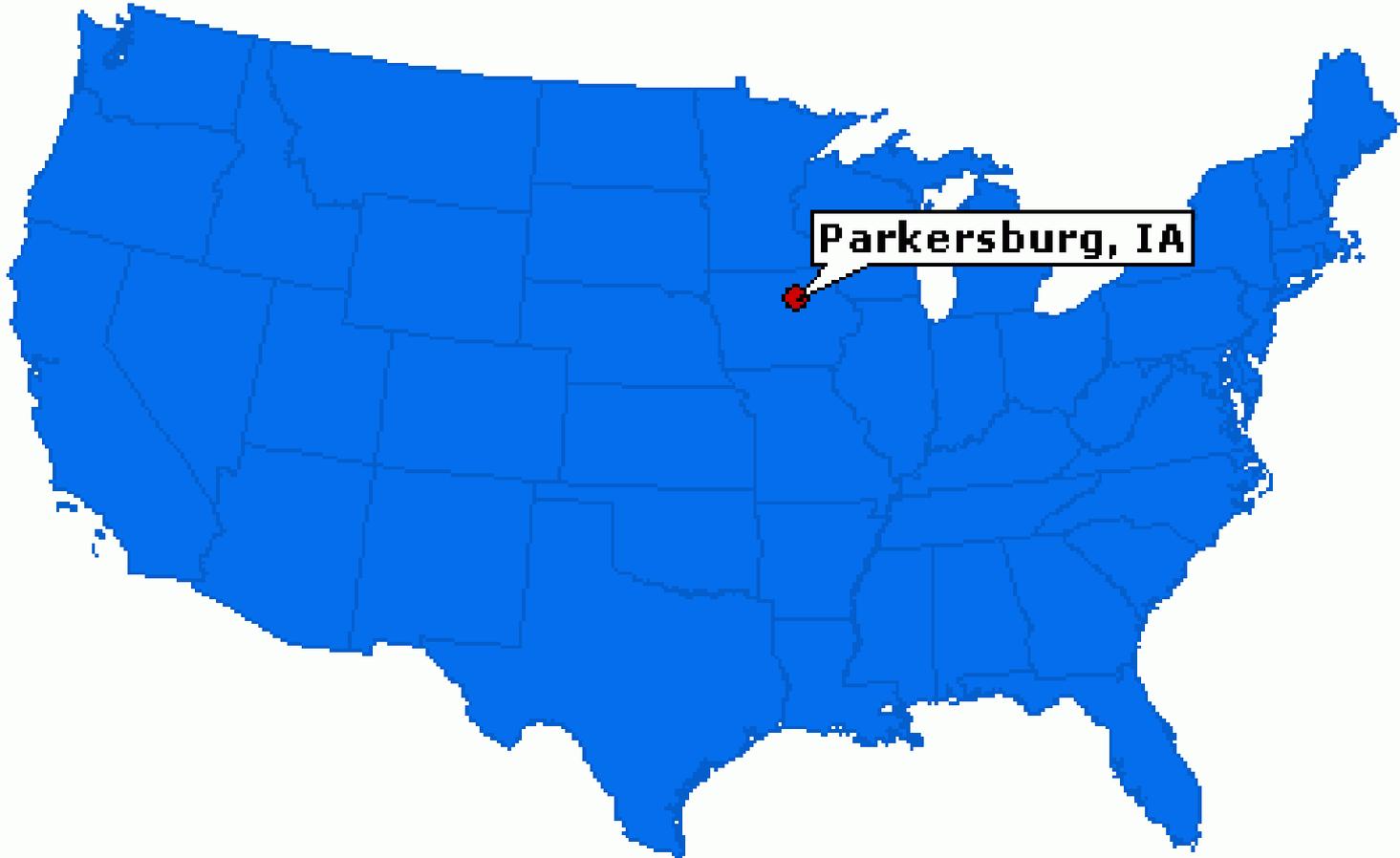
Greensburg, Kansas

Location – Kiowa County, Zip Code 60754



Parkersburg, Iowa

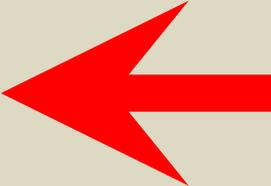
Location – Butler County, Zip Code 50665



Recent EF-5 Tornado Disaster Recovery Efforts

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1. Introduction

2. Research Project Overview 

3. Greensburg, Kansas

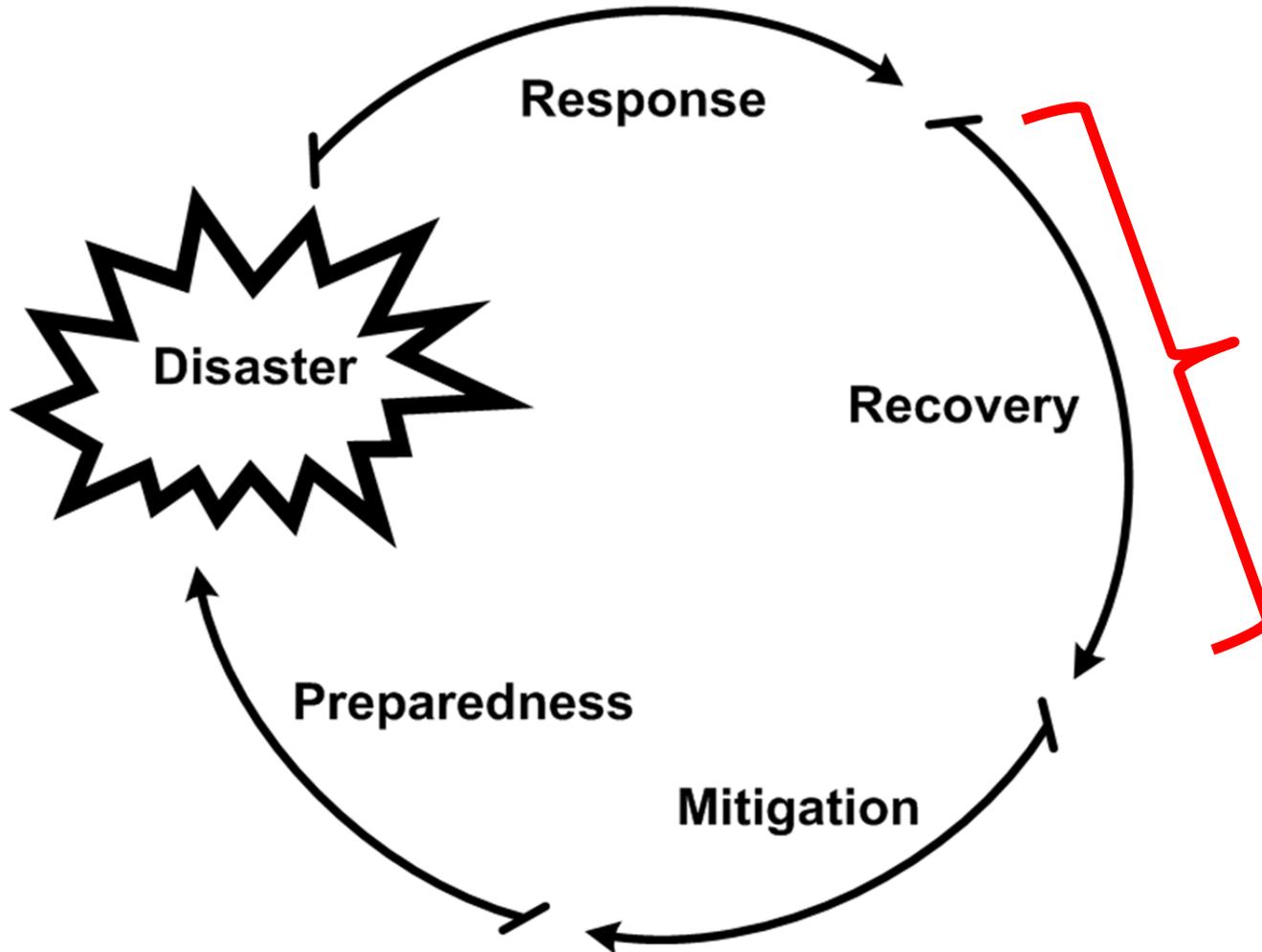
4. Parkersburg, Iowa

5. Analysis

6. Conclusion

Disaster Cycle

Focus on Phase of Recovery



Disaster Recovery – Four Phase Model

Focus on 3rd & 4th Phases

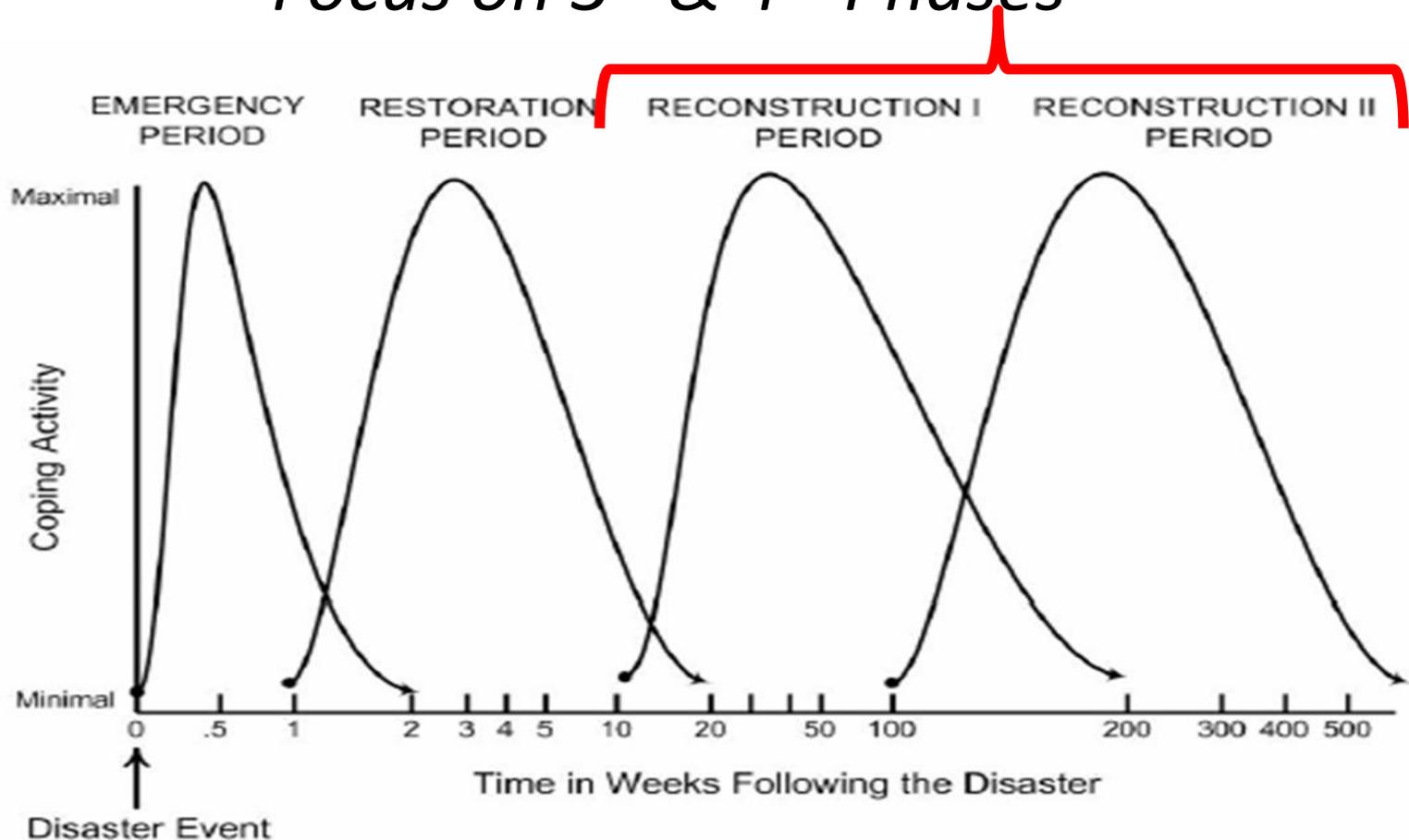


Figure 9. Four Phase Model of Disaster Recovery (Adapted from Haas, Kates, et al., 1977)

Disaster Recovery – Four Phase Model

Focus on 3rd & 4th Phases

- 3rd Phase – Reconstruction One
 - *Rebuild to community to the point that it was prior to the disaster*
 - *Convert temporary fixes to permanent solutions*
- 4th Phase – Reconstruction Two
 - *Opportunity to rebuild to make the community better than what it was before the disaster*
 - *Sustainable development*

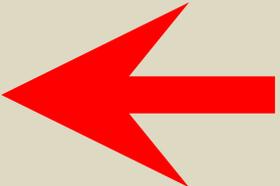
Research Project

EF-5 Tornado Disaster Recovery

- Case Studies of two somewhat similar Midwestern EF-5 tornado towns
- Qualitative, longitudinal research
- Approaching 5 years – goal is 10 year study
- Attempt to determine recovery models and lessons learned from EF-5 tornado experiences

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Greensburg EF-5 Tornado

Facts

- May 4, 2007
- Tornado hit city center
- 95% of city destroyed
- Killed eleven persons
- Population prior to disaster 1,574

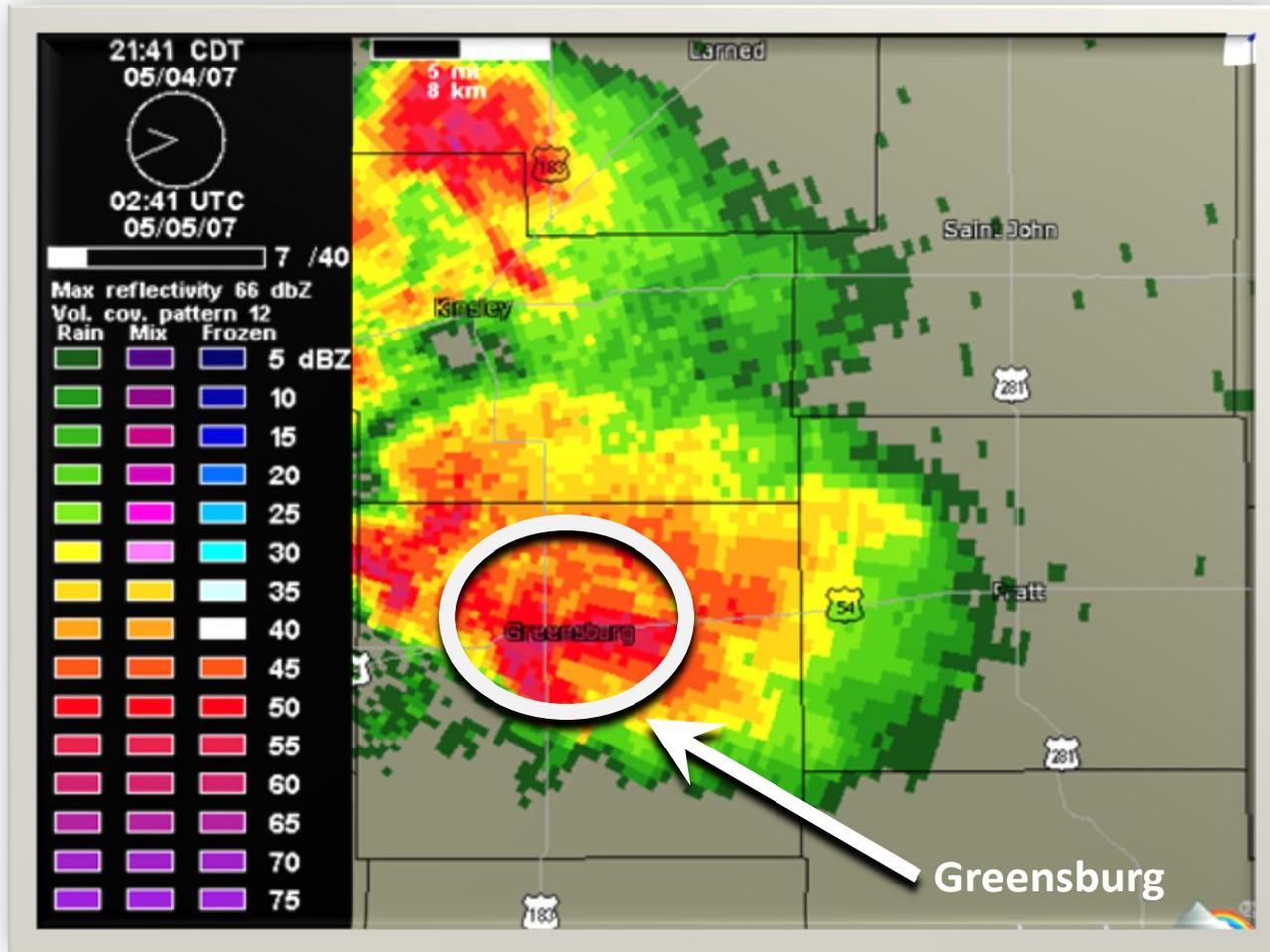
Slide Source: MSNBC

Greensburg Rises After Tornado and Goes Green - May 1, 2008

<http://www.msnbc.msn.com/id/24416341>

Greensburg Tornado

Tornado Entering City at 9:41pm on May 4, 2007



Slide Source: Weather Underground

Dr. Jeff Masters WunderBlog

<http://www.wunderground.com/blog/JeffMasters/comment.html?entrynum=666>

Greensburg Tornado

May 4, 2007 ~ 9:40pm



Slide Source: High Plains Regional Climate Center Archives

Photo taken by Melanie Metz

<http://www.nebraskaweatherphotos.org/may4-2007Greensburg-Kansas-tornado.html>

Greensburg Tornado

EF-5 Debris Field



Slide Source: U.S. Department of Homeland Security, Federal Emergency Management Agency

Photo taken by Photo by Greg Henshall – FEMA

<http://www.photolibrary.fema.gov/photodata/original/30066.jpg>

Greensburg Recovery

EF-5 Tornado Disaster Recovery – March 2008



Greensburg Recovery

*March 2008 Observations – Break with the Old,
Restarting Community in New Image*



Greensburg Recovery

March 2008 Observations – Green Rebuilding



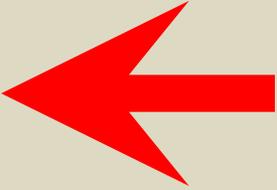
Greensburg Recovery

*March 2008 Observations – Innovative Community
Recovery Strategies*



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Parkersburg EF-5 Tornado

Facts

- May 25, 2008
- Destroyed one-third of city
- Killed seven persons
- Injured 70 persons
- Population prior to disaster 1,889

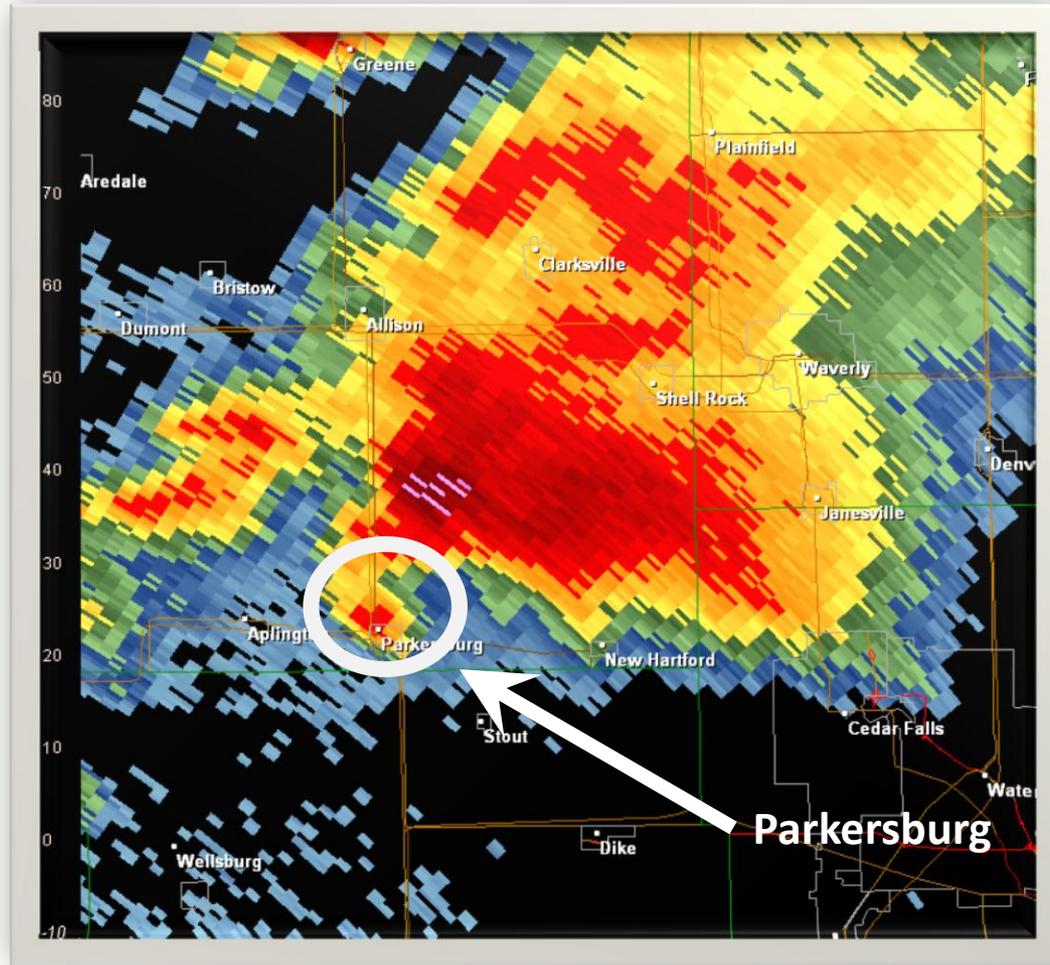
Slide Source: Des Moines Register

Parkersburg Rebuilds with Hammers and Heart – May 17, 2009

<http://www.desmoinesregister.com/article/20090517/NEWS/905170340/1001>

Parkersburg Tornado

Tornado Entering City at 4:59pm on May 25, 2008



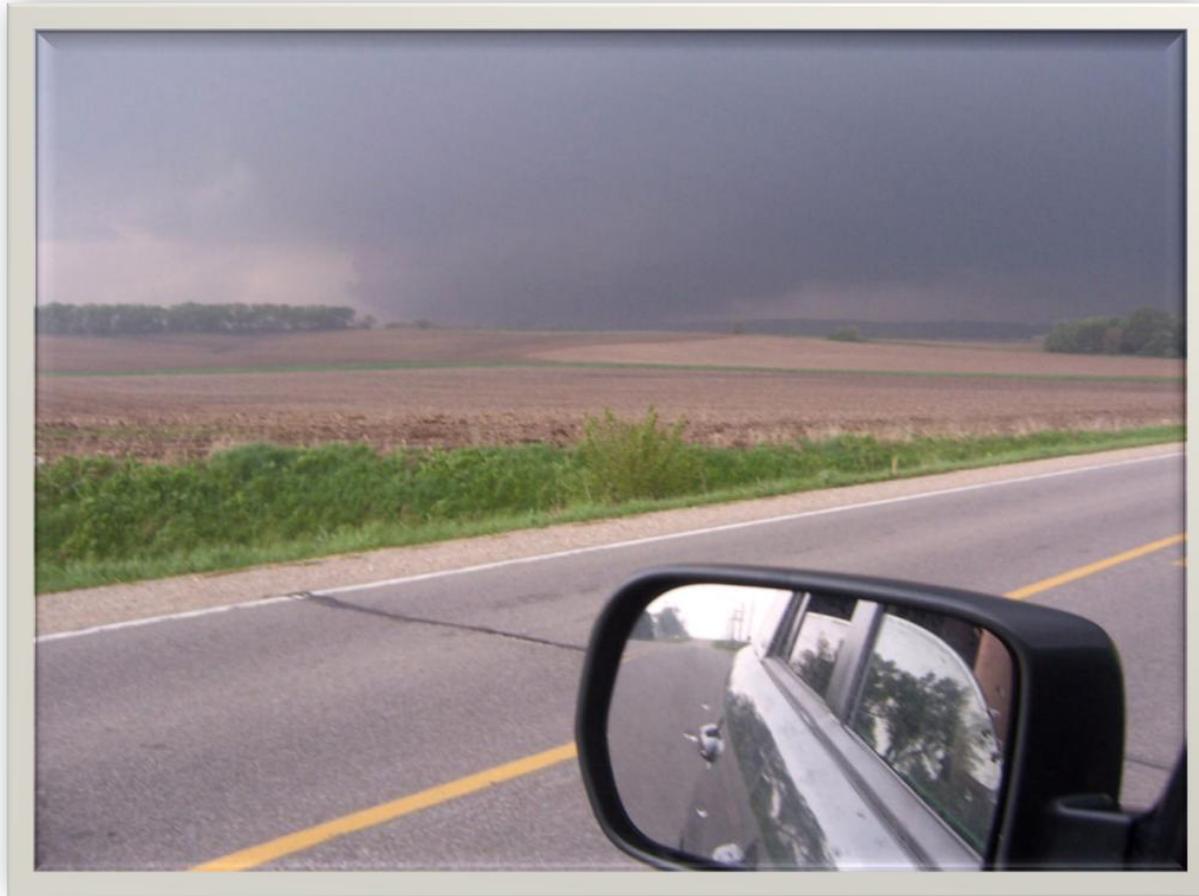
Slide Source: National Weather Service

4:59 p.m. base reflectivity image from the NWS WSR-88D in Des Moines

<http://www.crh.noaa.gov/Image/dmx/ParkersburgTornado/2159zRefPburg.png>

Parkersburg Tornado

May 25, 2008 at 5:05pm



Slide Source: National Weather Service

Photo taken by NWS Des Moines Meteorologist Rod Donavon

<http://www.crh.noaa.gov/dmx/?n=parkersburg>

Parkersburg Tornado

EF-5 Debris Field



Picture Source: National Weather Service Parkersburg Tornado Storm Damage Survey
<http://www.crh.noaa.gov/images/dmx/parkersburg/Parkersburg-Storm-Damage-Survey.pdf>

Parkersburg Recovery

EF-5 Tornado Disaster Recovery – April 2009



Parkersburg Recovery

April 2009 Observation -- Very Rapid Rebuilding



Parkersburg Recovery

April 2009 Observation – Individual Driven



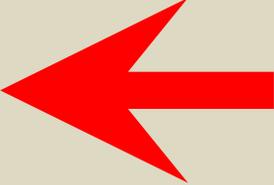
Parkersburg Recovery

April 2009 Observation – Individuals Work in Concert



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Population Comparisons

Post-Tornado Greensburg and Parkersburg

Town	2000 Census Population	EF-5 Tornado	2010 Census Population	% of Pre-Tornado Pop.
Greensburg	1574	May 4, 2007	777	49%
Parkersburg	1889	May 25, 2008	1870	98%

Greensburg 3 years – 49% of Population Back

Parkersburg 2 Years – 98% of Population Back

Greensburg & Parkersburg

Selected Similarities

- Community Setting
 - ❖ *Greensburg – Rural Midwest Agriculture*
 - *Parkersburg – Rural Midwest Agriculture*
- Disaster Type – Intensity
 - ❖ *Greensburg – EF-5 tornado*
 - *Parkersburg – EF-5 tornado*
- *Population before disaster*
 - ❖ *Greensburg – 1574*
 - *Parkersburg - 1889*

Greensburg & Parkersburg

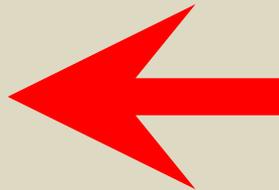
Selected Differences

- Damage Extent
 - ❖ *Greensburg – Nearly entire community*
 - *Parkersburg – Approx. 1/3 of community*
- Immediate Recovery Trajectory
 - ❖ *Greensburg – Remake an entirely different town*
 - *Parkersburg – Build on the old, strengthen*
- Recovery Focus
 - ❖ *Greensburg – Innovation & Experimentation*
 - *Parkersburg – Known Practices & Stability*

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Greensburg, Kansas

Emerging Recovery Lessons

- Disaster - opportunity for community betterment
- Focus on innovation and remaking town in new image
- Green or environmental friendly recovery
- Branding and marketing recovery with sponsors, television programs, and tourism

Greensburg, Kansas

Key: Green Rebuilding Plans – March 2008



Parkersburg, Kansas

Emerging Recovery Lessons

- Disaster - opportunity for community betterment
- Focus on drawing upon internal strengths and remaking town in same image
- Rapid recovery, individuals work in concert
- Community-based focal point for recovery – rally around high school football activities and coach

Parkersburg, Iowa

Key: Rebuilding of High School – April 2009



Final Conclusions

Emerging EF-5 Recovery Lessons

- Five years out is too soon to gauge successes or failures of comprehensive community recovery
 - *Greensburg 5-year anniversary is 2012*
 - *Parkersburg 5-year anniversary is 2013*
- Where will Greensburg stand in 2017?
- Where will Parkersburg stand in 2018?

Final Conclusions

Emerging EF-5 Recovery Lessons

➤ Emerging Greensburg Model

– Slower recovery drawing on external innovation and new leading-edge creativity

➤ Emerging Parkersburg Model

– Faster recovery drawing on internal strengths and existing community cohesion

Final Conclusions

Goals

- Establish EF-5 tornadoes as a unique type of weather disaster with common recovery challenges
- Establish lessons learned from case studies
- Have a set of options or models for the next EF-5 tornado town to consider life after the disaster

Final Conclusions

Significance

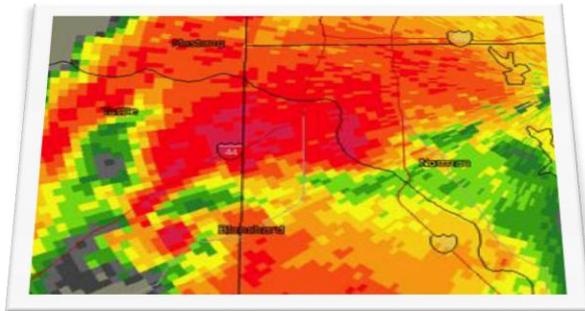
- 2011 tornado season illustrates the need
- Six new towns facing the EF-5 recovery issues
- Suggest that it is not necessary to start from scratch, others have developed ways to deal with the aftermath of EF-5 tornadoes

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